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EXAMINER

FINK, BRIEANN R

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



### **DETAILED ACTION**

**The partial translation was for Uchida, which was cited along with the Derwent abs on the 892 for the FAOM. The partial translation is used and referenced to in the second paragraph of the rejection below.**

1. This office action follows a reply filed on January 5, 2010. Claims 1, 8, 14-15, 20, 23, 25-26, 31, and 38 have been amended. Claims 14 and 23-25 are currently pending and under examination.
2. The Declaration under 37 CFR 1.132 filed 1/6/10 is insufficient to overcome the rejection of claims 14 and 23-25 based upon anticipation as set forth in the last Office action because: unexpected results is a secondary consideration with respect to obviousness.
3. The rejections of claims 14 and 23 under 35 U.S.C. 103(a) as being unpatentable over *Dershem et al.* (US 6,034,194) and *Dershem et al.* (US 6,034,195) are withdrawn, as applicants have amended claims 14 and 23 to limit the maleimide compound as containing no aromatic groups, as they are required by *Dershem et al.*

4. The rejection of claims 14 and 23-25 under 35 U.S.C. 102(b) as being anticipated by and under 35 U.S.C. 103(a) as being unpatentable over *Uchida et al.* (JP 04-159315) are deemed proper, as set forth in the previous office action, and are therefore maintained. An English translation has been requested.

5. The texts of those sections of Title 35 U.S. Code are not included in this section and can be found in a prior Office action.

### ***Claim Objections***

6. Claims 15-22 and 26-32 are objected to because of the following informalities: they list incorrect status identifiers. See MPEP 714(II)(C).

Claims 15, 20, 26, and 31 were amended as is evident from the status identifier; however, they are also withdrawn from prosecution at this time as they relate to unelected species. Therefore, the status identifiers of these claims should have read "Currently Amended and Withdrawn", as was done, for example, in claim 8.

Claims 16-19, 21-22, 27-30, and 32 were indeed previously presented, as indicated by the current status identifier; however, they are also withdrawn from prosecution at this time as they relate to unelected species. Therefore, the status identifier of these claims should have read "Withdrawn".

7. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

8. Claims 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 claims a resin composition comprising a filler (A), an allyl ester compound (G); however, goes on to describe the maleimide compound (B) which was included in claim 14. It is unclear as to whether the applicants were intending to include (B') into the resin composition. Currently, the resin composition does not require the presence of the maleimide compound.

9. Claims 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the thermal radical initiator. As evident in applicants arguments submitted January 5, 2010, it appears that the composition must comprise the thermal radical initiator in order for the resin composition to exhibit the necessary properties, such as sufficient flexibility and adhesion (See p. 16).

***Claim Interpretation***

10. For purposes of examination and the originally filed claims, the examiner is going to assume that the resin compositions must comprise the following: the filler (A),

maleimide compound (B), a thermal radical initiator (C), and compound (D), as in claim 14, OR (G), as in claims 23-25, and substantially not containing a photo polymerization initiator.

***Claim Rejections - 35 USC § 102***

11. Claims 14 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by *Uchida et al.* (JP 04-159315). However, for convenience, the Derwent Abstract will be cited below (Derwent Acc. No. 1992-231959).

*Uchida et al.* discloses a composition having heat resistance and adhesion that are useful for electronics comprising allyl oligomers and a polyfunctional maleimide, having the general formula as shown on page 117 of the Japanese document. The allyl oligomers can have structure of formula (I) which is  $\text{CH}_2=\text{CHCH}_2\text{O}(\text{CORCOOBO})_n\text{CORCOOCH}_2\text{CH}=\text{CH}_2$ , where R is an organic residue of any divalent saturated carboxylic acid and B is an organic group derived from any divalent saturated alcohol.

A partial oral translation was able to determine R to be a residue of, for example, butyric acid (where R<sup>12</sup> of the instant invention would be 3 carbons), adipic acid (4 carbons), sebacic acid (8 carbons), azelaic acid (7 carbons), and cyclohexane dicarboxylic acid (6 carbons), which all fall within the requirement of a hydrocarbon of 2-8 carbons as required by instant claim 23, as well as a few aromatic acids,. As for B, it was determined to be a residue of, for example,

propylene glycol (where  $R^{13}$  of the instant invention would be 3 carbons), propane diol (3 carbons) and butane diol (4 carbons), which all fall within the requirement of a hydrocarbon of 3 to 6 carbons as required by instant claim 25. See page 116.

*Uchida et al.* also discloses using peroxides as the initiator and curing the composition at elevated temperatures.

As for the required filler, a partial oral translation was able to determine that indeed the resin is used as resins containing glass and carbon fibers, which are commonly known in the art as typical fillers. See page 120.

12. Claims 14 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by *Herr et al.* (US 6,265,530).

*Herr et al.* discloses an adhesive for use in semiconductors which comprise a maleimide compound, a vinyl compound, a curing initiator, and optionally, a filler (col. 1, ll. 43-49).

*Herr et al.* discloses the maleimide compounds to have a structure represented by  $[M-X_m]_n-Q$ . M is a maleimide moiety. When  $m$  is 0,  $n$  is 2, and Q is an ester of  $-R^3-C(O)O-R^3-O(CO)-R^3-$ , and  $R^3$  can be an alkyl or alkyloxy, the bis-maleimides of the instant invention are obtained (col. 3-4).

As to the vinyl compounds, *Herr et al.* discloses them as having the structure  $[R_1-CH=CHR_2-B-X_m]_n-Q$ . When  $R_1$  and  $R_2$  are H, B is C,  $m$  is 0,  $n$  is 2, and Q is  $-R_3-OC(O)-R_3-(CO)O-R_3-[-OC(O)-R_3-(CO)O-R_3-]_p-$ , and  $R_3$  can be

independently an alkyl or alkyloxy group, the compound (D) and allyl esters of (G) are obtained.

*Herr et al.* discloses the curing initiator to be that of a free-radical initiator, such as peroxides, including dicumyl peroxide (col. 2, ll. 44-16). Note this is the same initiator used in the examples of the instant invention (see instant specification, Examples E1-E3, p. 67). *Herr et al.* discloses inclusion of a photoinitiator or the combination of photoinitiation and thermal initiation as alternatives (col. 2, ll. 60-67); therefore, the presence of a photoinitiator is construed as being optional in the invention of *Herr et al.*

*Herr et al.* discloses the fillers to include copper, gold, silica and alumina (col. 3, ll. 14-18). Note these are some of the same fillers described in the instant specification (see p. 15).

### ***Claim Rejections - 35 USC § 103***

13. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Uchida et al.* (JP 04-159315). However, for convenience, the Derwent Abstract will be cited below (Derwent Acc. No. 1992-231959).

*Uchida et al.* anticipates instant claims 24 and 25 as described above and applied here as such, because *Uchida et al.* discloses some of the proper residues of R and B in order to meet the compounds of the instant invention by choosing two non-aromatic residues.



In the chance that one of ordinary skill in the art would not find this anticipated, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have chosen any combination of R and B, including that of two non-aromatic residues.

14. Claims 14 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Herr et al.* (US 6,265,530).

*Herr et al.* anticipates instant claims 14 and 23-25 as described above and is applied here as such, because *Herr et al.* discloses resin adhesives for semiconductors comprising a filler (A), the maleimide compounds (B), a thermal radical initiator (C), and the polymerizable compounds (D) and (G).

In the chance that one of ordinary skill in the art would not find this anticipated, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared the composition described in the rejection above, as *Herr et al.* clearly teaches the compounds of the instant invention, as well as the combination of such.

### ***Response to Arguments***

15. Applicant's arguments in view of *Uchida et al.* have been fully considered but they are not persuasive. The rejection is based on and relied on the Derwent abstract and the partial oral translation obtained and noted in the previous action. A machine translation

of *Uchida et al.* is not available; however, a full translation has been ordered. Once the translated document becomes available to the examiner it will be forwarded to the applicants.

Although *Uchida et al.* uses aromatic bis-maleimides in the examples, there is a broader teaching of possible bismaleimides. Also note, the allyl esters of *Uchida et al.* read on those of the instant invention, as claims 14, 23 and 25 allow for aromatic allyl esters and as to claim 24, *Uchida et al.* suggests alicyclic allyl esters as was determined by the partial oral translation note in the previous action.

16. Applicant's arguments with respect to the rejections in view of *Dershem et al.* have been considered but are moot in view of the new ground(s) of rejection, as the previous rejections in view of *Dershem et al.* have been withdrawn, as applicants have limited the bis-maleimides to exclude aromatic groups.

### ***Conclusion***

17. Applicant's amendment, exclusion of aromatic groups in the bis-maleimide compounds, which was not previously presented, necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Briann R. Fink whose telephone number is (571)270-7344. The examiner can normally be reached on Monday through Friday, 7:00 AM to 4:30 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton I. Cano can be reached on (571)272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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